

REGIONAL COMPETITION - ROUND 1

TOSS-UP

1. ASTR; Multiple Choice: What type of star will our sun ultimately become at the end of its life?
- a) Red Giant
 - b) Neutron Star
 - c) White Dwarf
 - d) Black Dwarf

ANSWER: D--BLACK DWARF

BONUS

1. ASTR; Multiple Choice: What is the angle by which magnetic north and true north differ is known as?
- a) angle of declination
 - b) angle of incidence
 - c) angle of differentiation
 - d) polar angle

ANSWER: A--ANGLE OF DECLINATION

TOSS-UP

2. BIOL; Multiple Choice: Like all other unicellular organisms, this protozoan carries out all metabolic and self-perpetuating functions within the confines of its single cell. It both feeds and moves about by throwing out projections of its body wall called pseudopodia (sue-doe-pod-ia) into which the protoplasm flows, thus carrying it forward. This genus of one-celled animals found in fresh water is called:
- a) Amphibia
 - b) Amoeba
 - c) Algae
 - d) Bacteria

ANSWER: B--AMOEBA

BONUS

2. BIOL; Short Answer: Ants live on all continents except one. Name it.

ANSWER: ANTARCTICA.

TOSS-UP

3. PHYS; Short Answer: List the commonly accepted four forces in nature.

ANSWER: GRAVITY, ELECTROMAGNETISM, STRONG NUCLEAR FORCE, AND WEAK NUCLEAR FORCE

BONUS

3. PHYS; Multiple Choice: What is the basic principle behind Einstein's Special Theory of Relativity?

- a) The Universe is curved
- b) The laws of physics are invariant to inertial frames of reference
- c) The speed of light is not a constant in free space
- d) The Universe is flat

ANSWER: B--THE LAWS OF PHYSICS ARE INVARIANT TO INERTIAL FRAMES OF REFERENCE

TOSS-UP

4. CHEM; Short Answer: Which American Chemist, known for work on the nature of the chemical bond, won Nobel Prizes in both Chemistry and Peace?

ANSWER: (LINUS) PAULING

BONUS

4. CHEM; Multiple Choice: What element of the period table represents the "break even" point in terms of nuclear fusion versus nuclear fission?

- a) Hydrogen
- b) Uranium
- c) Helium
- d) Iron

ANSWER: D--IRON

TOSS-UP

5. GENR; Multiple Choice: For what did Albert Einstein received his Nobel Prize in Physics?
- a) Photoelectric effect
 - b) Special Theory of relativity
 - c) General Theory of relativity
 - d) Big Bang theory

ANSWER: A--PHOTOELECTRIC EFFECT

BONUS

5. GENR; Short Answer: What U.S. Army Major was responsible for inventing the superheterodyne receiver and for making FM transmission a reality?

ANSWER: (EDWIN H.) ARMSTRONG

TOSS-UP

6. COMP; Multiple Choice: Instructions such as LOAD, ADD, NO OPERATION are examples of what type of programming language?
- a) COBOL
 - b) Assembly code
 - c) Fortran
 - d) PASCAL

ANSWER: B--ASSEMBLY CODE

BONUS

6. COMP; Multiple Choice: In indirect addressing, the instruction word contains what information about the data?
- a) Instruction word contains data itself
 - b) Instruction word contains address of memory location where address for data is stored
 - c) Instruction word contains address where data is stored
 - d) None of the above

ANSWER: B--INSTRUCTION WORD CONTAINS ADDRESS OF MEMORY LOCATION WHERE ADDRESS FOR DATA IS STORED

TOSS-UP

7. CHEM; Multiple Choice: What thermodynamic characteristic of a property is also known as "Time's Arrow"?
- a) enthalpy
 - b) entropy
 - c) free energy
 - d) volume

ANSWER: B-- ENTROPY

BONUS

7. CHEM; Multiple Choice: What did the Rutherford scattering experiment show?
- a) That electrons were in certain orbits
 - b) That the nucleus was made up of neutrons and protons
 - c) That the atom had a positively charged massive center
 - d) The existence of the K-particle

ANSWER: C--THAT THE ATOM HAD A POSITIVELY CHARGED MASSIVE CENTER

TOSS-UP

8. BIOL; Short Answer: Hydrotropism is the tendency of a plant to grow towards what?

ANSWER: WATER

BONUS

8. BIOL; Multiple Choice: Nitrogen and sulfur are components of atmospheric pollution that may adversely affect forest ecosystems. Which, if any, of these potential pollutants does a plant need to take up in order to function normally?
- a) Nitrogen
 - b) Sulfur
 - c) Both
 - d) Neither

ANSWER: C--BOTH

TOSS-UP

9. PHYS; Multiple Choice: What property makes it permissible for the neutrino to travel at the speed of light?
- a) Infinite energy
 - b) Zero energy
 - c) Zero mass
 - d) Zero momentum

ANSWER: C--ZERO MASS

BONUS

9. PHYS; Multiple Choice: What theory predicts the bending of light rays by gravity?
- a) Newtons Laws of Physics
 - b) Einstein's Special Theory of Relativity
 - c) Maxwell's Equations
 - d) Einstein's General Theory of Relativity

ANSWER: D--EINSTEIN'S GENERAL THEORY OF RELATIVITY

TOSS-UP

10. ERSC; Short Answer: Who was the author of "Silent Spring" the book which dealt with the effect of pesticides on our environment?

ANSWER: RACHEL CARSON

BONUS

10. ERSC; Multiple Choice: How many miles is a league?
- a) 1 mile
 - b) 2 miles
 - c) 3 miles
 - d) 10 miles

MILES

ANSWER: C--3

TOSS-UP

11. BIOL: Short Answer: Nitrogen and sulfur are essential building blocks of what biochemical components in plants?

ANSWER: AMINO ACIDS (ACCEPT PROTEINS)

BONUS

11. BIOL; Multiple Choice: Polychlorinated biphenyls (PCBs) are persistent, wide-spread toxic chemicals that were once commonly used in electric transformers. In aquatic habitats, PCBs can accumulate to high levels in fish when they eat other organisms that contain lower concentrations of PCBs. In what type of tissue do PCBs and related compounds tend to accumulate?
- a) Muscle
 - b) Fat
 - c) Blood
 - d) Bone

ANSWER: B--FAT

TOSS-UP

12. PHYS; Multiple Choice: A block is to be pulled along a smooth surface by a rope. Prior to actual motion, the force exerted on the rope is related to the normal force or weight of the object by what factor?
- a) coefficient of sliding friction
 - b) kinetic friction
 - c) coefficient of static friction
 - d) moment of inertia

ANSWER: C--COEFFICIENT OF STATIC FRICTION

BONUS

12. PHYS; Multiple Choice: An astronaut is weightless while orbiting the earth due to what condition?
- a) Out of earth's gravitational field
 - b) Cancellation of earth's gravitational field by that of the moon's
 - c) Free fall condition
 - d) Lack of air pressure in space vehicle

ANSWER: C--FREE FALL CONDITION

TOSS-UP

13. CHEM; Short Answer: If the Gram Molecular Weight of water is 18 grams how many moles of water are there in a beaker containing 180 grams of ice?

ANSWER: 10 MOLES

BONUS

13. CHEM; Short Answer: What two elements are the main constituents of solder?

ANSWER: LEAD AND TIN

TOSS-UP

14. MATH; Multiple Choice: The derivative with respect to x of the sine of $2x$ is?

- a) $\sin(2x)$
- b) $\cos(2x)$
- c) $2\cos(2x)$
- d) $2\sin(2x)$

ANSWER: C-- $2\cos(2x)$

BONUS

14. MATH; Multiple Choice: A penny is placed on a square of a checkerboard. Pennies are then placed on the remaining 63 squares such that the number of pennies are doubled for each successive square. The total number of pennies on the checkerboard is given by?

- a) 2 raised to the 64th power
- b) 2 raised to the 63rd power
- c) 64 factorial
- d) 2 raised to the 64th power minus one

ANSWER: D--2 RAISED TO THE 64TH POWER MINUS ONE

TOSS-UP

15. GENR; Short Answer: Along with Isaac Newton, who was credited with the development of differential calculus?

ANSWER: LEIBNITZ

BONUS

15. GENR; Multiple Choice: A typical telephone system utilizes what type of flow?
- a) simplex
 - b) full duplex
 - c) half duplex
 - d) complex

ANSWER: B--FULL DUPLEX

TOSS-UP

16. BIOL; Short Answer: What is the name of the process in which a chemical tends to become concentrated in an organism when the organism lives in an environment that contains low concentrations of the material?

ANSWER: BIOACCUMULATION

BONUS

16. BIOL; Short Answer: What common measure of the structure of biological communities is often used to assess water quality?

ANSWER: SPECIES DIVERSITY INDEX

TOSS-UP

17. ASTR; Multiple Choice: In 1992, the COBE orbiting satellite made measurements that supported the "big bang" theory of the origin of the universe. The measurements were of fluctuations in what?
- a) speed of solar winds
 - b) distribution of cosmic background radiation
 - c) amount of interstellar dark matter
 - d) number of black holes

ANSWER: B--DISTRIBUTION OF COSMIC BACKGROUND RADIATION

BONUS

17. ASTR; Multiple Choice: The common name of the north star is called Polaris. What is the name of the south star?
- a) Sigma Octantis
 - b) Alpha Centauri
 - c) Canopus
 - d) Rigel Kentaurus

ANSWER: A--SIGMA OCTANTIS

TOSS-UP

18. PHYS; Multiple Choice: Which of the following is the actual mass of an electron moving at 98% of the speed of light:
- a) no mass
 - b) same as its rest mass
 - c) more than its rest mass
 - d) less than its rest mass

ANSWER: C--MORE THAN ITS REST MASS

BONUS

18. PHYS; Multiple Choice: You are floating in a boat in a swimming pool. The boat contains some blocks of wood. The specific gravity of the wood is 0.66. You throw the wood blocks into the pool. When the waves settle, the depth of the water in the pool
- a) has increased
 - b) is the same as before
 - c) has decreased
 - d) is impossible to determine from the information given

ANSWER: B--IS THE SAME AS BEFORE

TOSS-UP

19. CHEM; Short Answer: What is the name for the enthalpy change when one mole of a compound is formed from the elements in their stable forms at 25 degrees Celsius and 1 atmosphere?

ANSWER: HEAT OF FORMATION

BONUS

19. CHEM; Short Answer: Inert gases do not readily react with other compounds due to what fact?

ANSWER: THEIR ELECTRON SUBSHELL POPULATIONS ARE FULL

TOSS-UP

20. ERSC; Short Answer: Iron Pyrite is also known by what slang name?

ANSWER: FOOL'S GOLD

BONUS

20. ERSC; This unit of measure is one-fifth of a gram and is used in determining the weight of gems. Identify the unit.

ANSWER: A CARAT

TOSS-UP

21. COMP; Short Answer: A physical, high speed memory, located in the CPU is commonly known as what type of memory?

ANSWER: CACHE MEMORY

BONUS

21. COMP; Short Answer: In hexadecimal, what is the symbol for the largest individual digit?

ANSWER: THE LETTER F

TOSS-UP

22. BIOL; Multiple Choice: What is the formula for BMI (Body Mass Index)?

- a) weight in pounds/height in inches
- b) weight in kilograms/height in meters
- c) weight in kilograms/(height in meters)squared
- d) weight in pounds/height in centimeters

ANSWER: C--WEIGHT IN KILOGRAMS/(HEIGHT IN METERS)SQUARED

BONUS

22. BIOL; Multiple Choice: Exaggerated forward curvature of the lower back is known as:

- a) Kyphosis
- b) Lordosis
- c) Orthoses
- d) Scoliosis

ANSWER: B--LORDOSIS

TOSS-UP

23. MATH; Short Answer: When two quantities are in inverse proportion, their graph is called a?

ANSWER: HYPERBOLA

BONUS

23. MATH; Short Answer: What interior angle is common to a pentagon with five equal sides?

ANSWER: 108 DEGREES

TOSS-UP

24. PHYS; Short Answer: What does the term LASER stand for?

ANSWER: LIGHT AMPLIFICATION THROUGH STIMULATED EMISSION OF RADIATION

BONUS

24. PHYS; Multiple Choice: What does the quantity $\frac{2}{5}$ times mass times radius squared represent for a sphere?

- a) Volume
- b) Surface area
- c) Moment of inertia
- d) Center of gravity

ANSWER: C--MOMENT OF INERTIA

TOSS-UP

25. CHEM; Short Answer: Neon with atomic number 10 has a full 1st and 2nd principal quantum level. If oxygen has atomic number 8 what is its electron configuration?

ANSWER: 1S-TWO, 2S-TWO, 2P-FOUR

BONUS

25. CHEM; Multiple Choice: A freshly opened can of soda pop represents a solution of carbon dioxide in water that is which of the following:
- a) supersaturated
 - b) unsaturated
 - c) saturated
 - d) colloidal suspension

ANSWER: A--SUPERSATURATED
